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(54) **SYSTEM AND METHOD FOR SEARCHING
INFORMATION STORED ON A NETWORK**

(56) **References Cited**

U.S. PATENT DOCUMENTS

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5,875,446 A * 2/1999 Brown et al. 707/3
5,930,474 A * 7/1999 Dunworth et al. 709/217
6,038,560 A * 3/2000 Wical 707/5
6,070,158 A * 5/2000 Kirsch et al. 707/3
6,078,866 A * 6/2000 Buck et al. 702/2
6,112,203 A * 8/2000 Bharat et al. 707/5
6,308,202 B1 * 10/2001 Cohn et al. 705/27

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* cited by examiner

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

Primary Examiner—Alford Kindred

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(58) Field of Search **707/1-5, 513,**
707/500, 526; 709/217, 201

(57) **ABSTRACT**

A system and method for searching websites that use category information to narrow the range of a website content search. Website content is retrieved through a network and stored. A user starts a search by selecting a category or categories in which information Pertinent to the user's needs is likely to be found. The user then performs a keyword search on the content of websites that fall within the selected category or categories. The results of this category-content search are sent and displayed to the user.

21 Claims, 10 Drawing Sheets

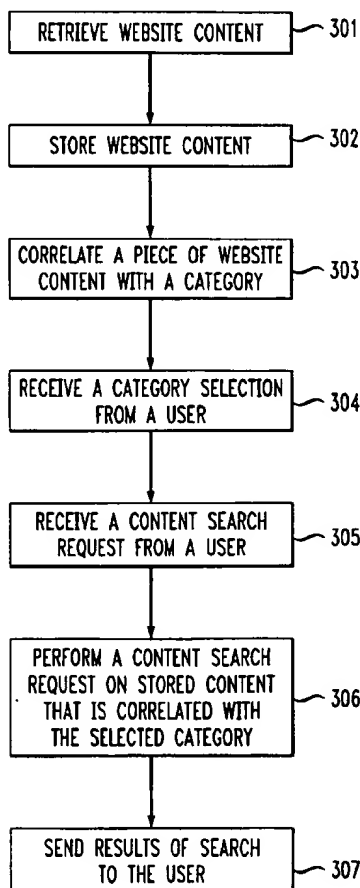


FIG. 1 PRIOR ART

What's New Check Email	Personalize	Help
Yahoo! Pager send instant messages	SURPLUS DIRECT	Make Yahoo! your home page
	CARS WERE MORE FUN	
<input type="text"/>	<input type="button" value="Search"/>	options
Yahoo! Mail - get your free @yahoo.com email address		
Shopping - Yellow Pages - White Pages - Maps - Classifieds - Personals - Message Boards - Chat		
Email - Pager - My Yahoo! - Today's News - Sports - Weather - TV - Stock Quotes - more...		
101	103	
Arts & Humanities	News & Media	In the News
Literature , Photography...	Current Events , Newspapers , TV...	Suharto resigns
102		Pager service returning
Business & Economy	Recreation & Sports	\$195M Powerball has winner
Companies , Finance , Jobs...	Sports , Travel , Autos , Outdoors...	Tommy Lee get 6 months
Computers & Internet	Reference	NBA and NHL playoffs more...
Internet , WWW , Software , Games...	Libraries , Dictionaries , Quotations...	
Education	Regional	
Universities , K-12 , College Entrance...	Countries , Regions , US States...	
Entertainment	Science	Inside Yahoo!
CoolLinks , Movies , Humor , Music...	Biology , Astronomy , Engineering...	Y! Games - online chess...
Government	Social Science	Today's TV listings
Military , Politics , Law , Taxes...	Archaeology , Economics , Languages...	Y! Online - ISP for \$14.95
Health	Social & Culture	Yahoo! Visa - 9.99% APR
Medicine , Diseases , Drugs , Fitness...	People , Environment , Religion...	more...
World Yahoos Asia - Australia & NZ - Canada - Chinese - Denmark - France - Germany		
Italy - Japan - Korea - Norway - Sweden - UK & Ireland		
Yahoo! Metros LA - NYC - SF Bay - more...	Get Local <input type="text"/>	<input type="button" value="Enter Zip Code"/>
Other Guides Autos - Computers - Games - Live Net Events - Movies - Personal Finance		
Seniors' - Sports - Travel - Y! Internet Life - Yahooligans! for Kids		
Smart Shopping with		
How to Suggest a Site - Company Info - Privacy Policy - Contributors - Openings at Yahoo!		

FIG. 2 PRIOR ART

YAHOO! [Personalize](#) [Help - Check Email](#)

[Home:](#) [Arts:](#) [Humanities:](#)
[Literature](#)

[Find and buy any book now. Amazon.com](#)

[News & Events](#) [Headlines](#), [Live Net Events](#)
[Community Chat](#), [Message Boards](#)
[Shopping](#) [Shopping Guide](#)

202 Telephone 204 Search 203 just this category

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- [Education \(56\) NEW!](#)
- [Electronic Literature \(76\)](#)
- [Events \(54\) NEW!](#)
- [Exhibits \(3\)](#)
- [Genres \(5266\) NEW!](#)
- [History of Books and Printing \(101\)](#)
- [Institutes \(135\)](#)
- [Journals \(38\)](#)
- [Libraries@](#)
- [Magazines \(453\) NEW!](#)
- [Mailing Lists \(12\)](#)
- [Museums \(15\)](#)
- [Online Forums \(31\)](#)
- [Organizations \(99\)](#)
- [Periods and Movements \(226\)](#)
- [Poetry \(1909\) NEW!](#)
- [Publishing@](#)
- [Reference \(79\)](#)
- [Reviews \(127\)](#)
- [Scripts \(7\)](#)
- [Storytelling@](#)
- [Television Shows@](#)
- [Trivia \(7\)](#)
- [Indices \(40\)](#)
- [Usenet \(20\)](#)

201


- [Book Report, The](#) - book review, excerpts, a gift guide, editorials, and interviews with authors.
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- [Booktalk](#) - all the buzz about books.
- [BookWeb](#) - author tours, bookstore directories, discussion groups, etc.
- [BookWire >REVIEW<](#) - bestseller lists, reviews and more
- [Chapter One](#) - featuring full first chapters of books with reviews and discussions, from the Washington Post.
- [Digital Book World](#) - index of new and old books, by author, title or publisher, as well as links to

FIG. 3

PRIOR ART

YAHOO! [Personalize](#) [Help](#) - [Check Email](#)

Search Result Found 0 categories and 1 site for Telephone



This search was restricted to a sub-category. For more matches, try and [unrestricted search.](#)

[Categories](#) [Web Sites](#) [AltaVista](#) [News Stories](#) [Net Events](#)

Yahoo! Site Matches (1 - 1 of 1)

[Arts](#): [Humanities](#): [Literature](#): [Genres](#): [Literary Fiction](#): [Authors](#): [Cliff, Michelle](#)

• [Michelle Cliff](#) - Jamaica-born author of Abeng, No Telephone to Heaven, and Free Enterprise.

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[Go to AltaVista](#) 301

Telephone

Next Search

[options](#) - [help](#)

Other Search Engines

[AltaVista](#) - [WebCrawler](#) - [HotBot](#) - [Lycos](#) - [Infoseek](#) - [Excite](#) - [Image Surfer](#) - [DejaNews](#) - [More...](#)

[Yellow Pages](#) - [People Search](#) - [City Maps](#) - [Get Local](#) - [Today's Web Events & Chats](#) - [More Yahoos](#)

Copyright © 1994-98 Yahoo! Inc. - [Company Information](#) - [Help](#)

FIG. 4 PRIOR ART

Search

[Click Here!](#) [Finance](#) [Travel](#) [Get Wild](#) [Health](#)

[Business Search](#) [People Search](#) [Browse by Subject](#)

Search for documents in

[Help](#) [Preferences](#) [New Search](#) [Advanced Search](#)

308773 documents match your query. 404

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1. AT&T Capital Leasing Service - hard drive 403
 I am a VAR, Reseller or Manufacturer currently using AT&T Capital Leasing Services to provide financing to my clients. I am a VAR, Reseller or...
<http://www.ceolink.com/> - size 5K - 14-Aug-97 - English - [Translate](#)
2. Wanted:used AT&T smartphones
 Wanted:used AT&T smartphones. Posted by Kent Williams (kentw@mail.startext.net) on Tue - Apr 30 08:00:38 EDT 1996. Looking for used AT&T smartphones.....
<http://www.payphones-usa.com/freebies/messages/830865638.html> - size 364 bytes - 30-Apr-96-English - [Translate](#)
3. AT&T Virtual Classroom Contest '97
 AT&T Virtual Classroom Contest '97. English. Japanese. What's New The latest news about the VC97 Program. Press releases are also archived here. About.
<http://www.vc97.attjens.co.jp/> - size 11K - 5-Mar-98 - English - [Translate](#)
4. SDRAM AT&T memory 1-(888) 910-0900
 memory upgrades, SDRAM AT&T memory, ram shipped to your door overnight. all major credit cards accepted (888) 910-0900 (toll free)
<http://www.magicmac.com/memory/0/mem155.htm> - size 2K - 24-Jul-97 -English - [Translate](#)
5. "AT+T Global Information Solution A/S", Denmark
 X.500 White Pages Directory. Move upwards to. The World. Denmark. Subtree search in AT+T Global Information Solutions A/S: AT+T Global Information...
<http://ds2.internic.net:8888/o%3d%22AT+T%20Global%20Information%20Solutions%20A%2fS%20> - size 3K - 24-Aug-94 - English - [Translate](#)
6. The Ultimate Directory - AT&T WorldNet Service
 Yellow Pages White Pages Classifieds Investing Community City Guide Government

FIG. 5

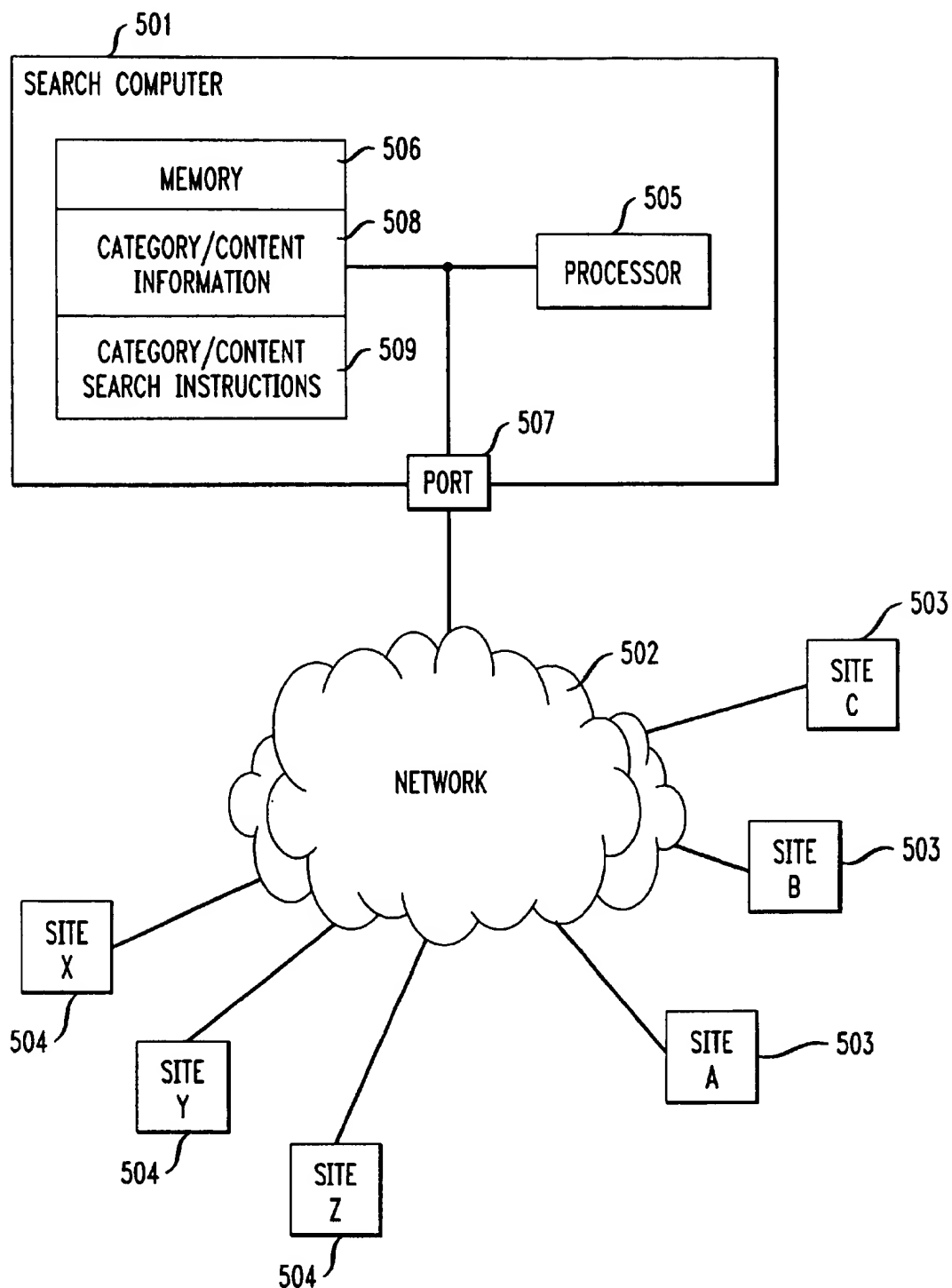


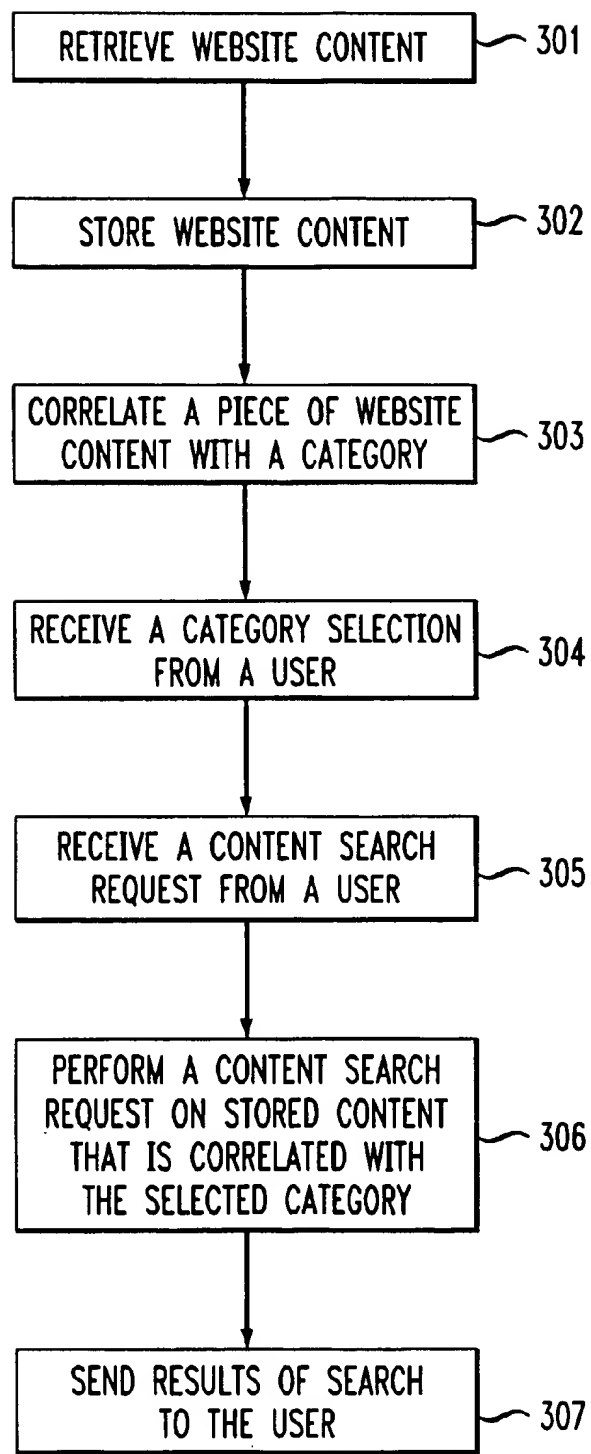

FIG. 6

FIG. 7



- SITE REGISTRATION
- ABOUT
- SEARCH STATS
- FEEDBACK
- DISCUSSION
- WHAT'S NEW
- USER GUIDE
- TEXT VERSION
- HELP
- WEBMASTER
- IRC
- INTRANET TEAM
- INFOCENTER
- POST
- HOME

IntraSearch
 AT&T Internal Sites Search Engine

search by
keyword

INTRA[NET]@AT&T

Search for: (Now case sensitive)

☒ On the AT&T Intranet
☐ In This Subject

search by
subject

701

- ◆ **Products And Service**
 - Online Services, Business Markets...
- ◆ **Information Sources**
 - Publications, Directories, Policies...
- ◆ **Technology Development**
 - Broadband, Internet, Wireless Communications...
- ◆ **Competitive Information**
 - Long Distance, Competitors A-Z...
- ◆ **Business Processes**
 - Marketing, R&D, Corp. Governance....

702

- ◆ **Geographic Location**
 - Asia, Europe, N. America...
- ◆ **Internal Services**
 - Employee Services, Education, Training...
- ◆ **Business Units**
 - BMD, Consumer Markets, Local
- ◆ **AT&T Community**
 - Personal Pages, Volunteers...

more key
features

<u>Newly Registered Sites</u>	The latest sites to be registered with IntraSearch within the last 60 days.
<u>Registered Sites List</u>	Alphabetical listing of all registered sites on the AT&T Intranet.
<u>Search Registered Sites Database</u>	Find AT&T Web Sites by searching through Registered Sites Database. You can search for URL of Site Home Page, Name of Site or Site Description.

FIG. 8

AT&T

SITE REGISTRATION
ABOUT
SEARCH STATS
FEEDBACK
DISCUSSION
WHAT'S NEW
USER GUIDE
TEXT VERSION
HELP
WEBMASTER
IRC
INTRANET TEAM
INFOCENTER
POST
HOME

IntraSearch
AT&T Internal Sites Search Engine

search by
keyword

Search for:

☐ On the AT&T Intranet
☒ In Products And Service

Home
Products And Services

- AT&T WorldNet Services 801
- Home Entertainment Services
- Local Services
- Long Distance Services
- Wireless Communication Services

Q AT&T Digital Link - AT&T Digital Link Implementation Plan status documents.

Q AT&T MultiQuest 900 Services - AT&T's 900 Service INTERNET website. For the INTRANET site (internal AT&T) please see: <http://900resources.web.att.com>

Q IOL (Information Online) Main Menu -

Q ITS Technical Documents Site - A division of BMD, AT&T Solutions, Access to ITS Technical Documents which includes ITS Bulletins, Libraries, Service Descriptions, Templates, User Guides and links to Foundation Architecture documents. Most documents available in PDF format.

Q ITS' Global Network -

Q Libraries and Information Services - Library and Information services. IRC Information Research Center. Document Supply. Consultant Programs. Newsletters. Online Services. Internal Technical Document Services. Subject Matter Experts.

Q MVS Technical Service District - Home page for the MVS Technical Services District. Information available: District contact list, early impact guide for MVS distributions.

Q Middle Markets Village - Primary vehicle for distributing news and reference information to Middle Market associates and all the related support organizations.

Q Nodal Services Provisioning Web Site - This is where you'll find information on our processes, initiatives, performance reports along with other pertinent information.

Q Wholesale Markets -

Q kms home page - features, new items, help, glossaries, indexes....

FIG. 9

AT&T

SITE REGISTRATION
ABOUT
SEARCH STATS
FEEDBACK
DISCUSSION
WHAT'S NEW
USER GUIDE
TEXT VERSION
HELP
WEBMASTER
IRC
INTRANET TEAM
INFOCENTER
POST
HOME

IntraSearch

AT&T Internal Sites Search Engine

search by
keyword

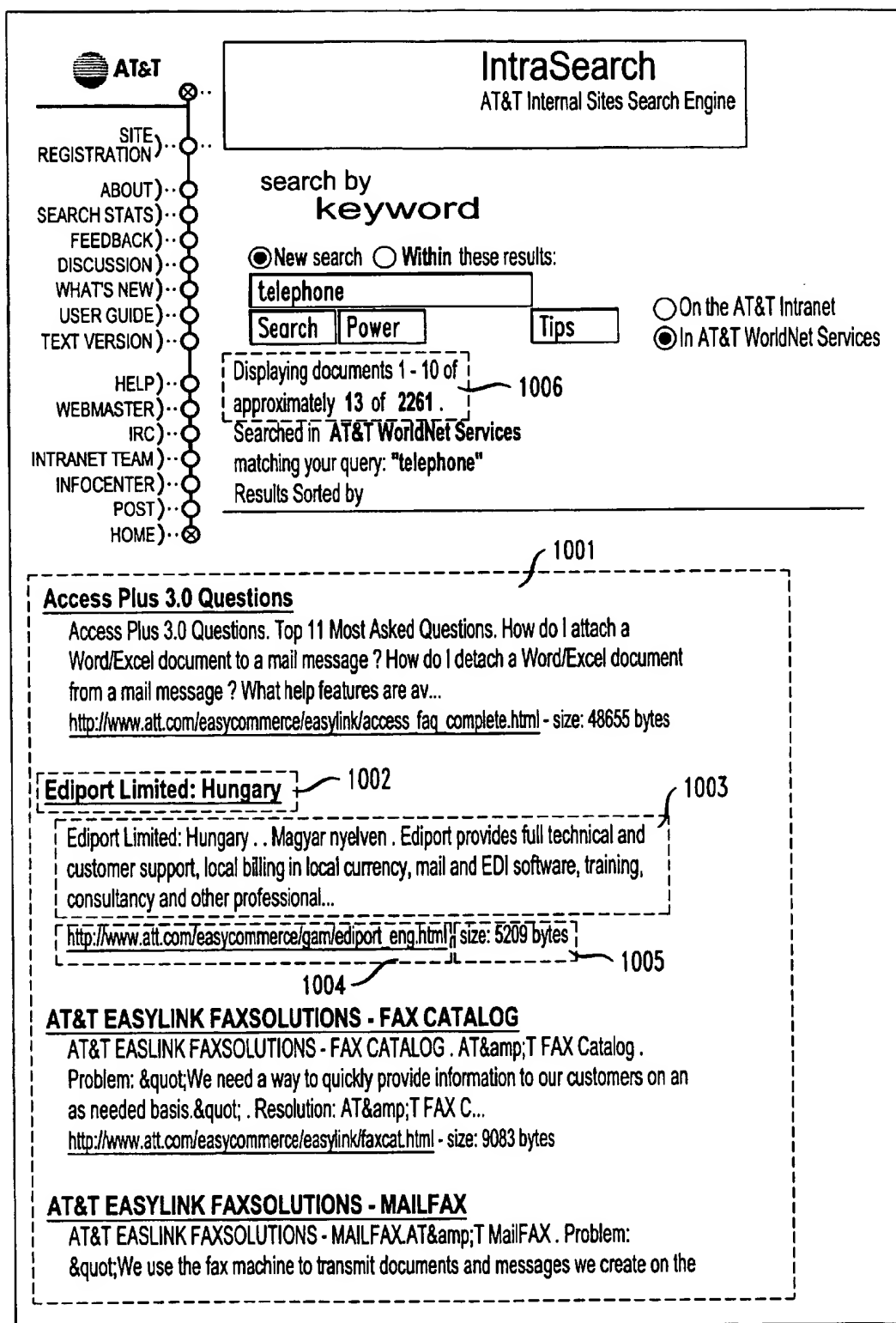
Search for: 901

☐ On the AT&T Intranet
☒ In AT&T WorldNet Services

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[Products And Services](#)
[AT&T WorldNet Services](#)

- ☐ [AT&T TeleConference Services \(HQ\) - AT&T TeleConference Services \(HQ\)](#)
- ☐ [ATT EaseCommerce Service -](#)
- ☐ [ATT WorldNet Service Product Marketing -](#)
- ☐ [CSB CIO InState/Local Home Page -](#)
- ☐ [Internet Network Team Reference Site \(AT&T-EMEA\) - This site provides the EMEA IP-TONE team with an up-to-date view of AT&T-EMEA & AUCS peerings, regional backbone network plans, Link utilization reports, capacity planning, contacts, and links to other useful network planning sites](#)
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- ☐ [Web Site Services Network Operations Center - This site describes the AT&T Web Site Services Network Operation Center, located in Middletown, VA., its people and its services.](#)
- ☐ [Web Site Services Network Operations Center - Home page for WSS Network Operations Center in Middletown, VA. Details work performed and services offered. Lists information about the people that make it happen.](#)

FIG. 10



SYSTEM AND METHOD FOR SEARCHING INFORMATION STORED ON A NETWORK

BACKGROUND OF THE INVENTION

The field of the invention is searching, and in particular searching for information stored in a set of websites.

A website ("site") is defined herein as a collection of files stored on a computer (e.g., a server) that is connected to a network. The World Wide Web (WWW) is a collection of websites whose servers are interconnected through the Internet. A collection of websites can also be stored on servers that are interconnected through a private network, e.g., through an intranet.

In many cases, at least some of the files of a website contain hyperlinks. A hyperlink is typically a text, graphic or image object in a first file that, when selected by a user, either causes a second file to be displayed to the user, causes a different part of the first file to be displayed to the user, or executes a program. In this way, a file in a website can be interrelated with another file stored at the same website, a different website, or elsewhere. The interrelated files of a single website usually reflect a common theme, such as information about a particular company, activity, or service.

The amount of information stored in a collection of websites can be substantial. For example, the WWW includes over 600,000 websites. Conservatively assuming an average data size of 2 Megabytes (MB) per website, the WWW includes over 1200 billion bytes of information across a wide range of topics. Finding a particular piece of information in such a large collection can be problematic. For example, simple browsing through the websites in search of a particular type of information can be impractical in a website collection of substantial size.

One known system addresses the problem of finding particular information stored at websites by categorizing websites according to the topic or topics to which they pertain. One such known system is the Yahoo! search engine located at <http://www.yahoo.com>. Yahoo! obtains information about the topic or theme to which a website pertains along with a brief narrative describing the contents of the website (i.e., from the administrator or owner of the website). This information (along with a website identifier) is then correlated with a category. The Yahoo! categories are organized hierarchically, so that a given category typically has one or more subcategories, and each such subcategory has further subcategories, etc.

An example of a Yahoo! interface is shown in FIG. 1. An example of a category is Arts&Humanities, 101, which has subcategories Literature 102 and Photography 103. When a user selects the Literature subcategory 102, Yahoo! displays the page shown in FIG. 2 to the user. FIG. 2 shows numerous subcategories 201 of the Literature subcategory 102. Hereinafter, the term "category" will be used interchangeably with the term "subcategory."

Yahoo! also accommodates keyword searching. In FIG. 2, a user has entered a search for the keyword "telephone" 202 that is restricted 203 to websites in the Literature category. In this case, the user may be interested in finding literature where the telephone plays a major role. When the search button 204 is selected, only website descriptions, and not website content, that fall under the category "Literature" are searched for the term "telephone." Website descriptions are generally terse, one line or one paragraph summaries describing the content of the website. A website description cannot fully capture all of the detail contained in the

website's content. Indeed, by definition, it is a summary. Because only the descriptions are keyword searched, and not the content, a Yahoo! keyword search can disadvantageously miss relevant content even when the keyword search is limited to website descriptions in a relevant category. Websites whose descriptions contain the term "telephone" are displayed to the user, as shown in FIG. 3.

As discussed above, because Yahoo! keyword searches only search the descriptions of websites and not their content, a Yahoo! keyword search can miss identifying websites that contain information relevant to the user's request. Thus, for example, many files at different websites in the Literature category may well contain the keyword "telephone." None of these would be detected and displayed to the user by Yahoo!, even though the user is interested in finding occurrences of "telephone" in websites that fall within the Literature category. In this way, the Yahoo!-type category/descriptive information search is overly narrow, and is prone to miss detecting information that the user would be interested in seeing.

Another known system for searching for information at websites stores and indexes a vast amount of content from numerous websites, but does not correlate website content with categories. Such a known system is the AltaVista™, located at <http://www.altavista.digital.com>. In AltaVista™, a user submits a keyword search. FIG. 4 shows the AltaVista™ interface in which a user has submitted a keyword search request for the term "AT&T" 401. In response, AltaVista™ searches its stored content for occurrences of the term "AT&T", and shows the user the websites that have content in which the term occurs (402.) Some excerpted content (e.g., 403) is also displayed. It is difficult for the user to efficiently and accurately identify websites that have content of interest to the user.

Just as the Yahoo!-type search can be too narrow, the AltaVista™-type content search can be too broad. For example, the results for the keyword search shown in FIG. 4 include over 300,000 websites 404. Even when the results are organized in some prioritized fashion (e.g., websites with the greatest number of occurrences of the keyword term are listed first), such a broad result is too large to be very useful to the user.

Searching by category and then using a keyword search to search the descriptive information about websites within a category can be too narrow, and miss detecting websites that have content that is relevant to the user's request. On the other hand, keyword searching of only the content of websites can be too broad. A way is needed to take advantage of the narrowing effect of a category search and the depth of a content search to yield a more accurate and complete search result.

SUMMARY OF THE INVENTION

In accordance with an embodiment of the present invention, websites are searched for desired information first by narrowing the scope of the search by identifying websites that correspond with a category pertinent to the desired information. Next, a keyword search is carried out on the content (not just the descriptions or summaries of content) of websites that fall within the pertinent category. This is advantageously more efficient than searching all of the content of the universe of websites initially, because such a search often disadvantageously returns too many results, many of which can be irrelevant (e.g., as in AltaVista™). Likewise, it provides higher resolution than simply performing a category search, which can fail to identify websites

within the category that have the most relevant information. It also provides higher resolution than narrowing the field of websites by category, and then performing a keyword search on website descriptions or content summaries, e.g., as in Yahoo!, which can miss relevant information that is included in the content itself, but not in the description or summary. The present invention advantageously combines the efficiency and accuracy of category and content searching to provide a more efficient, better way of finding the information most relevant to a user's need in a set of websites.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows an interface to a prior art embodiment of a category/descriptive information search engine.

FIG. 2 shows a keyword search request for websites that fall within a subcategory of the prior art search engine shown in FIG. 1.

FIG. 3 shows the results of the keyword search request submitted as shown in FIG. 2 in the prior art search engine shown in FIG. 1.

FIG. 4 shows an interface and a keyword search request to a prior art embodiment of a content search engine.

FIG. 5 shows a system in accordance with an embodiment of the present invention.

FIG. 6 is a flow chart illustrating an embodiment of the method in accordance with an embodiment of the present invention.

FIG. 7 shows an interface in accordance with an embodiment of the present invention.

FIG. 8 shows an interface that displays categories for user selection in accordance with an embodiment of the present invention.

FIG. 9 shows an interface that displays subcategories of the categories shown in the interface depicted in FIG. 8 for user selection in accordance with an embodiment of the present invention.

FIG. 10 shows the results of a content search after category selection in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

The present invention provides a system and a method that advantageously combines the best aspects of category searching and content searching of websites in a way that enables a user to more accurately and completely identify websites with content of interest to the user, especially in a large collection of websites.

A system in accordance with an embodiment of the present invention is shown in FIG. 5. A search computer 501 is connected to a network 502 to which users 503 and sites 504 are also connected. The search computer 501 includes a processor 505, a memory 506 and a port 507. The memory 506 and the port 507 are coupled to the processor 505. The memory 506 stores website content correlated with categories 508. The memory 506 further stores category-content search instructions 509 adapted to be executed by the processor 505 to retrieve content from websites over a network and cause the retrieved content to be stored, to correlate a piece of content with a category, to receive a category selection from a user, to receive a keyword search from the user, and then to perform a content search on that stored website content which is correlated with the selected category. The term "correlated with the selected category" encompasses subcategories in embodiments having a hier-

archical categorization scheme. The category-content instructions 509 are further adapted to be executed by the processor 505 to send the results of a search to the user.

In one embodiment of the present invention, website content is automatically gathered and stored using a software application called a spider, such as the Vspider, manufactured by Verity, Inc. of Sunnyvale, Calif. A spider is a computer program that automatically seeks out information (i.e., content) distributed on various nodes of a network (e.g., at websites on the Internet, or on an intranet) and sends it back to a predetermined location (e.g., the spider's "home server") such as a search computer shown as 501 in FIG. 5. A spider such as Vspider can advantageously be used to collect the content to be searched in accordance with the present invention.

In one embodiment, the content that is retrieved by a spider is stored in a database. The database is coupled to a search computer, such as search computer 501 shown in FIG. 5. The content is searchable in the database using a known database search language, such as SQL.

In one embodiment, the Vspider is given the Uniform Resource Locator (URL) of a website. Vspider then searches the file corresponding to the URL, and identifies links from that file to other pages (the terms file and page are equivalent as used herein), which it proceeds to search. Upon searching a page, Vspider returns information such as the identity of the author of the page, the date on which the page was created, its size and some analysis of its textual content, possibly including at least a part of the textual content itself. An embodiment of the present invention advantageously uses the Verity spider in this fashion to automatically and efficiently gather website content, as well as information about the website.

In one embodiment, the processor 505 is a microprocessor, such as the Pentium II processor manufactured by the Intel Corporation of Santa Clara, Calif. In another embodiment, the processor 505 is an Application Specific Integrated Circuit (ASIC) which at least partly embodies the category-content instructions 509, the rest of which (if any) are stored in the memory 506.

Embodiments of memory 506 include read-only memory (ROM), random access memory (RAM), a hard disk, a compact disc, a database, or any other device adapted to store information in digital form, or any combination thereof.

The term "adapted to be executed by the processor" is meant to encompass instructions that are compressed, encrypted, uncompiled, or must otherwise be processed in order to be executed by the processor 505. Machine language or any other format of instruction that can be executed by the processor 505 without further manipulation are also meant to be encompassed by this term.

A method in accordance with an embodiment of the present invention is now described with reference to the flow chart shown in FIG. 6. Website content is retrieved through a network (step 301), and is stored (step 302.) A piece of stored website content is correlated with a category (step 303.) A category selection is received from a user (step 304.) A content search request (e.g., a keyword search request) for websites in the selected category is received from the user (step 305.) A content search on the stored website content that is correlated with the selected category is then performed (step 306.) The results of this category-content search are sent to the user (step 307.)

FIG. 7 shows an interface for an embodiment of the present invention through which a user selects a category.

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Categories 701 are listed under the heading "Search by Subject." For example, a user selects the "Products and Services" category 702, which causes the interface shown in FIG. 8 to be displayed. The user then selects the subcategory "AT&T WorldNet™ Services" 801 (shown in FIG. 8), which causes the interface shown in FIG. 9 to be displayed. As shown in FIG. 9, the user then submits a search for the keyword "telephone" 901. A content search for files in which the term "telephone" occurs is performed on content (e.g., files) stored from websites that fall into the category "AT&T WorldNet™ Services." The results of the search are displayed to the user in one embodiment as a dynamically generated web page, such as the one shown in FIG. 10. The term "dynamically generated web page" means a web page that includes content specifically tailored to respond to the user query.

In one embodiment of the present invention, a dynamic index is stored that includes a list of identifiers (e.g., URLs) for websites that are associated with a selected category. The dynamic index is used to track the identities of all websites that correspond to a selected category or categories. For example, in a hierarchical category system wherein a category includes certain other categories (e.g., the literature category includes the classics and modern romance categories), a dynamic index includes identifiers for all websites in the selected category and its subcategories. When a user further narrows a category selection, the identifiers of newly excluded websites are dropped from the dynamic index. Likewise, when a user broadens a category selection, the identifiers of newly included websites are added to the dynamic index.

A content search in one embodiment searches all of the content of all of the pages that comprise a website that falls within the selected category or categories. In another embodiment, the content search is performed by searching a subset of the content stored at the website in the selected category. For example, the content search can be restricted to the contents of metatags in the pages of the website. A metatag is defined herein as a subset of content marked-off from other content in a page. For example, the following line of text is embedded in a page at a website:

This is the content that will not be searched <METATAG> and this is the content that will be searched </METATAG> That is, the content between <METATAG> and </METATAG> will be searched, while the rest will not be searched.

Files that contains the term "telephone" are shown (1001) ranked in order where a file with more occurrences of the keyword is shown before a file with fewer occurrences. The name of the file (or site) 1002 is displayed, along with an excerpt of content (1003) from the file or site. A hyperlink (1004) to the site or file is also provided, as well as an indication of the file's size (1005.) The number of the results (1006) returned for a search in accordance with the present invention is typically substantially smaller (and therefore more manageable) than the number of results returned for an identical search request submitted to Alta Vista™. Also, the present invention advantageously provides more comprehensive and accurate results than a comparable Yahoo! search in many cases. The advantageous combination of category and content searching provided in accordance with the present invention produces website search results that are more accurate and comprehensive than the results provided by known systems.

Although several embodiments are specifically illustrated and described herein, it will be appreciated that modifica-

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tions and variations of the present invention are covered by the above teachings and within the purview of the appended claims without departing from the spirit and intended scope of the invention.

What is claimed is:

1. A method for searching for information stored at websites, comprising the steps of:

- a. retrieving website content through a network;
- b. correlating a piece of retrieved website content with a category;
- c. receiving a category selection;
- d. receiving a content search request for content in the selected category; and
- e. performing a content search on retrieved website content that is correlated with the selected category.

2. The method of claim 1, further comprising the steps of:

- f. receiving description information for a website from a registrant; and
- g. correlating the website with a category based upon the description information.

3. The method of claim 1, further comprising the step of presenting a first category name to a user as a hyperlink to a second category name, the second category being a subcategory of the first category.

4. The method of claim 1, wherein the step of performing the content search includes the steps of:

- a. maintaining a dynamic index that includes a list of identifiers for websites that are associated with the selected category;
- b. searching a representation of the content of each website whose identifier occurs in the dynamic index; and
- c. sending the results of the search to the user.

5. The method of claim 1, wherein performing a content search includes the step of performing a keyword search.

6. The method of claim 1, wherein the content search includes performing a keyword search on the contents of metatags stored in pages at the website.

7. The method of claim 1, wherein the step of performing the content search includes the steps of:

- a. maintaining a web page index that includes a list of identifiers for web pages that comprise a website;
- b. receiving a website selection from a user;
- c. receiving a web page content search request from the user;
- d. searching the content of the web pages that comprise the selected website based upon the web page content search request from the user; and
- e. sending the results of the web page content search to the user.

8. The method of claim 1, wherein a category selection is a Uniform Resource Locator.

9. The method of claim 7, wherein the step of sending the results of the web page content search to the user includes the step of sending the Uniform Resource Locator of a web page in which information responsive to the user web page content request is stored.

10. The method of claim 1, wherein the step of performing the content search includes the steps of:

- a. maintaining a web page index that includes a list of identifiers for web pages that comprise a website;
- b. receiving a website selection from a user;
- c. receiving a web page Uniform Resource Locator search request from the user;

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- d. searching the Uniform Resource Locators of the web pages that comprise the selected website based upon the web page Uniform Resource Locator search request from the user; and
- e. sending the results of the web page Uniform Resource Locator search to the user.
- 11. The method of claim 1, further comprising the step of sending the results of the content search to a user.
- 12. The method of claim 11, wherein the results sent to the user are adapted to be displayed ranked in the order of their relevance such that a more relevant result is displayed before a less relevant result.
- 13. The method of claim 11, wherein the results of the content search are sent to the user as a dynamically generated web page.
- 14. The method of claim 11, wherein the results sent to the user include a website identifier and information pertaining to the content of the website corresponding to the identifier.
- 15. An apparatus for searching for information stored at websites, comprising:
 - a. a processor;
 - b. a memory that stores category-content search instructions adapted to be executed by said processor to retrieve content from websites, store the retrieved content, correlate a piece of stored content to a category, receive a category selection, receive a content search request, perform a content search of stored website content that is correlated with the selected category, and to send the results of the content search to a user, said memory coupled to said processor; and
 - c. a port adapted to be coupled to a network, said port coupled to said processor and said memory.
- 16. The apparatus of claim 15, wherein said category-content search instructions are further adapted to be executed by said processor to receive description informa-

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tion for a website from a registrant, and to associate the website with a category based upon the website description information.

17. The apparatus of claim 15, wherein said category-content search instructions are adapted to be executed by said processor to maintain a dynamic index that includes a list of identifiers for websites that are associated with the selected category, to search a representation of the content of each website whose identifier occurs in the dynamic index, and to send the results of the search to a user.

18. The apparatus of claim 15, wherein said category-content search instructions are further adapted to be executed by said processor to dynamically generate a web page that reflects the results of the category-content search and that is adapted to be displayed to a user.

19. The apparatus of claim 15, wherein said memory includes a database.

20. The apparatus of claim 19, wherein said content-category search instructions are adapted to be executed by said processor to search, read from and write to said database.

21. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform the method steps for searching for information stored at websites, the method steps comprising:

- a. retrieving website content through a network;
- b. correlating a piece of stored website content with a category;
- c. receiving a category selection;
- d. receiving a content search request for content in the selected category; and
- e. performing a content search on retrieved website content that is correlated with the selected category.

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